A NEW SPECIES OF CŒNOCYATHUS FROM CALIFORNIA AND THE BRAZILIAN ASTRANGID CORALS.

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I. A NEW SPECIES OF CŒNOCYATHUS FROM CALIFORNIA.

CŒNOCYATHUS BOWERSI, new species.

Plate LXXVII, figs. 1–3.

Corallum forming a clump of rather low corallites, reproduction by lateral gemmation. The free portions of the corallites are cylindrical or gradually enlarged upward, varying from 3.5 to 7.5 mm. in height. Transverse outline of the calices subcircular or slightly compressed, diameter from 4.5 to nearly 7 mm. Externally costate; the costæ equal, low, flat, and granulate, separated by narrow, slightly impressed intercostal furrows.

In the larger calices the fourth cycle of septa almost complete, primaries and secondaries of practically the same thickness and length, moderately stout, tertiaries and quaternaries usually rather thin. Septal margins entire, very slightly exsert. Septal faces densely and coarsely granulate. Pali strongly developed before the penultimate cycle, resembling those of *Caryophyllia;* they are usually much thicker than the septa before which they stand, and are about half as long.

Calice excavated, rather deep, abruptly depressed in the center. Columella well developed, composed of one or a few twisted or curled laths.

Locality.—San Miguel Island, California.

Type.—Cat. No. 21,138, U.S.N.M., donated by Dr. Stephen Bowers, of Los Angeles, California.

II. THE BRAZILIAN ASTRANGID CORALS.

In my Stony Corals of the Porto Rican Waters[a] I published the following paragraph: "There are three astrangids found on the Brazilian reefs. One is *Phyllangia americana;* another may be only a varietal form of *A. solitaria*, but probably is a distinct species: the third is an undescribed species, which I have named in manuscript, *Astrangia rathbuni*." Professor Verrill cites these remarks in his Revised List of Brazilian Reef Corals.[b] It is scarcely necessary to make remarks on the *Phyllangia americana*, but the two others will be described.

ASTRANGIA BRASILIENSIS, new species.

Plate LXXVII, figs. 3—6.

Corallites reproducing by budding from basal stolons, spreading over variously shaped objects of support, occasional lateral gemmation. The corallites are scattered, distant, from 1.5 to 4 mm., or even more, between their bases. Diameter at the calice from 2 to 4 mm.; height of full-grown corallites about 4 mm. Externally obscurely costate near the calicular edge, the costæ alternating in size. The lower portion of the corallites is encrusted, in some instances there appears to be epitheca.

Septa in three complete cycles with about half the members of the fourth, in a calice 2.5 mm. in diameter. This seems to be the usual number in the larger calices. The primaries may be slightly the largest, the secondaries almost equal them in size, or primaries and secondaries may be of practically the same size; the tertiaries are smaller; the quaternaries often rudimentary. Septal margins obscurely dentate, only slightly exsert. Erect narrow paliform lobes present before all septa except those of the last cycle. Sides of both septa and pali granulated. Calicular fossa deep. Columellar surface papillate.

Locality.—Periperi, Bahia, Brazil.

Type.—Cat. No. 10940 U.S.N.M. Collected by Richard Rathbun, Geological Commission of Brazil, 1876.

Remarks.—The preceding description is based on a single specimen. There are several other specimens in the United States National Museum. The principal variation shown is in the height of the corallites, which may be between 9 and 10 mm. tall. When the corallites are so tall the calices are somewhat larger, nearly 5 mm. in diameter, the septa somewhat more exsert and the costæ more pronounced.

A. brasiliensis is very closely related to *A. solitaria* (Le Sueur). The corallites of the former average smaller, are more scattered and more isolated than in the latter; the septa of the latter are stouter. *A. rathbuni* (the second Brazilian *Astrangia*) resembles *A. solitaria* in habitus more than does *A. brasiliensis*.

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[a] U. S. Fish Commission Bulletin for 1900, II, 1901, p. 299.

[b] Trans. Conn. Acad. Sci., XI, 1902, p. 194.

ASTRANGIA RATHBUNI, new species.

Plate LXXVIII.

Corallum incrusting, attached to objects of various shapes, often forming small, rounded clumps. The corallites are not crowded, and are more or less tufted. Reproduction by basal expansions, which are frequently stoloniferous in character, occasionally by lateral gemmation. Sometimes there appear to be shreds of epitheca around the corallites.

The corallites are rather tall, as much as 7 mm., but 4 mm. is probably an average. The calices are rather large. The measurements of 3 are as follows:

Measurements.	1.	2.	3.
	mm.	*mm.*	*mm.*
Greater diameter	7	6	4.5
Lesser diameter	6	5	3.5

The costæ of the corallites are indistinct, except just below the calicular margin, where they are small, but show a recognizable alternation of larger and smaller.

The septal margins project very slightly above the upper edge of the corallite wall; the septa are thin and narrow above the bottom of the calicular fossa. In the larger corallites there are four complete cycles. The members of the first and second cycles reach the columella, those of the third cycle usually bend toward the members of the second, and those of the fourth toward the members of the third. The margin of all septa are dentate, the dentations frequently truncated, sometimes showing secondary dentations on the inner edge, but not in the sinus between dentations. Paliform lobes are not distinctly differentiated. The calicular fossa is very deep. The columella is weak and is papillary above.

Localities.—Paqueta, Rio Janeiro, and Bay of Rio Janeiro, Brazil.

Type specimen.—Paqueta, Rio Janeiro (No. 10974, U. S. Nat. Mus.). Collected by Richard Rathbun, Geological Commission of Brazil, 1877. There are eight specimens in all.

Remarks.—The most nearly related recent species of the West Indian region is *Astrangia astreiformis* M. Edwards and Haime. The corallites of this species are more intimately united one to another, the septa are thicker, in three cycles, and the calicular fossa is shallower. *A. rathbuni* is more closely related to *Astrangia lineata* (Conrad) from the Chesapeake Miocene of the eastern United States, but there are important differences. The corallites of *A. lineata* are decidedly larger and are more turbinate in shape.

This species is named for Dr. Richard Rathbun.

EXPLANATION OF THE PLATES.

PLATE LXXVII.

Figs. 1, 2, 3, *Cœnocyathus bowersi*, new species. Fig. 1, a side view of the corallum, natural size; fig. 2, side view of a corallite, x 4; fig. 3, calicular view of a corallite, x 4.

Figs. 4, 5, 6, *Astrangia brasiliensis*, new species. Fig. 4, view of a colony from above, natural size; fig. 5, calicular view of two corallites, x 4; fig. 6, view of the side of the same corallites, x 4.

PLATE LXXVIII.

Astrangia rathbuni, new species. Fig. 1, corallum, natural size; fig. 2, calices, x 4; fig. 3, costæ, x 4.